

Office of Rail Regulation

**Part A Independent Reporter
Framework**

**Mandate: PR13 review of Network
Rail's Maintenance & renewal unit
costs used in planning**

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1 Executive summary

1.1 Mandate overview

The strategic objective of Mandate 34 is as follows;

“To determine the degree of progress Network Rail has made in developing and applying unit costs to support and substantiate its SBP M&R expenditure and efficiency projections. Arup will provide an independent review and opinion of the nature and quality of Network Rail’s M&R unit cost data and analysis, as well as non-unitised cost data and analysis, and their applicability and suitability for CP5 expenditure and efficiency planning including by operating route.”

Specifically the Reporter is required to report on the following items:

- The quality of Network Rail's process for producing M&R unit costs for the purposes of planning;
- The quality of Network Rail's non-unitised M&R expenditure forecasts for end of CP4; and
- The reconciliation of CP4 exit unit costs and CP4 exit non-unitised costs with Network Rail's planned CP4 exit efficiency and CP5 entry.

A complete version of the mandate is included in Appendix A.

Our response to the mandate has been undertaken in two phases. During the progressive assurance process we obtained a broad understanding of Network Rail’s approach to developing Maintenance and Renewals costs. Our conclusions from this work were finalised in our presentation of the 17th October and report of the 7th January 2013¹.

The second phase of work began following the publication of the Network Rail’s SBP on the 7th January 2013. The following report builds on the knowledge gained during progressive assurance and provides a comprehensive picture of how unit costs have been developed and applied in the production of the SBP.

1.2 Key findings

Network Rail has adopted a multiplicity of approaches to derive unit costs for Maintenance and Renewals planning purposes. These unit costs represent approximately 44% of the projected post efficient spend of £17.34bn for Maintenance and Renewals during CP5.

The remaining 56% (£9.6bn) of CP5 costs are based on a combination of specific item or project level cost estimates and allowances based on historic levels of spend (non-unitised costs). These approaches represent £1.2bn and £8.4bn of post efficient spend respectively.

¹ AO34: PR13 review of Network Rail’s Maintenance & renewal unit costs used in planning - Arup response to Network Rail comments, 7th January 2013.

The following table summarises our understanding of the estimated levels of unit cost coverage in the SBP.

Asset	Total post efficient SBP (Tier 0)	Post efficient value audited under M34	Estimated application of unitised costs versus SBP	Project estimates	Non-unitised costs
Track	3,431	3,006	88%	0%	12%
Signalling	3,490	2,159	62%	11%	27%
Structures	1,864	1,771	53%	24%	23%
Earthworks	414	414	87%	13%	0%
Drainage	168	168	86%	9%	5%
Civils "other"	197	-	-	-	100%
Buildings	1,187	1,187	30%	30%	40%
E&P	922	843	50%	-	50%
Telecomms	408	313	48%	-	52%
Other renewals	588	-	-	-	100%
Total Renewals	12,669	9,862	61%	9%	30%
Maintenance	4,669	-	0%	0%	100%
Total SBP	17,338	9,862	44%	7%	49%

Table 1.0: Estimated application of unit costs in the SBP for Maintenance and Renewals (GB).

Table 1.0 highlights a high degree of application of unit costs in Track, Earthworks and Drainage. Signalling, Structures, and E&P have a mid-level of unit cost application whilst Telecomms and Buildings have the lowest level of application at 48% and 30% respectively.

The adequacy of the levels of coverage observed can only be considered on an asset by asset basis rather than in the round. It should also be considered that the SBP contains items that cannot be estimated using unit costs. For example omitting "Other Civils & Renewals" from the analysis increases the overall application of unit costs to 47%. However, in the Reporters opinion based on the detailed analysis included in this report both Buildings and Telecomms unit coverage can be improved and coverage in excess of 70% for Renewals is achievable.

The use of route level estimates of Maintenance expenditure based on historic spend rather than unit costs lowers the overall level of unit cost coverage from 61% to 44%. A far greater level of coverage could have been achieved had the Maintenance Unit Cost framework been sufficiently developed for the routes to apply for SBP planning purposes.

1.2.1 Quality of Network Rail's unit cost processes

During progressive assurance we identified a number of issues relating to the quality of Network Rail's unit cost estimation processes. At the time, the approach to be taken at route level and the targeted level of coverage of unit costs was not fully understood.

In the context of the SBP, the unit cost processes must consider:

- Best practice in estimation or modelling techniques;
- Demonstrable line of sight between the rates developed and the SBP;
- Demonstration that allowances are reasonable and verifiable;

- Demonstration that coverage of unit costs is as high as possible;
- Consistency of processes and their application; and
- Strategic overview of unit costs and an understanding of the implications for business planning.

Based on the above criteria, the central challenge meetings, route level meetings and a significant number of one to one technical reviews our key findings for Renewals are as follows:

- Network Rail's existing Cost Analysis Framework (CAF) has not been utilised to the extent anticipated for Signalling, Buildings, E&P and Telecoms. At present the CAF system and process is being updated to correctly identify SEU and non-SEU components. Only the Civils asset makes use of the framework as a primary data source (albeit with a significant amount of data modelling). This demonstrates that CAF is not operating effectively as a tool to aid strategic business planning;
- A lack of strategic oversight in the estimation of risk allowances. Risk has been applied to specific rates or projects and also within non-unitised costs. Estimating risk using this approach, rather than at programme level, has a high potential to duplicate and overestimate risk allowances. Although risk presented within unit costs is clear, visibility of risk within project estimates and non-unitised costs is not transparent. This issue was also highlighted during progressive assurance;
- The importance of the work mix baseline for Track and Civils in determining the CP5 unit costs. Productive discussions have taken place with Network Rail (particularly with regard to Track) however greater clarity of the work mix used to derive 12/13 rates is needed in considering Network Rail's CP5 proposals across all work types;
- The Structures unit cost handbook (SBPT 3074) does not reflect the actual process adopted in the calculation of unit rates. Whilst CAF data is utilised the majority of underbridge and overbridge rates have been developed using modelling techniques that are not validated or described within the unit cost handbook. In addition, several errors have been made in the calculation of unit rates with a material impact on the costs presented in the SBP. These include the overestimation of management and preliminaries costs for individual Work Types and the inconsistent application of inflation assumptions and CP4 efficiencies. We maintain that there is still a significant potential for the over estimation of Structures costs within the SBP;
- Poor line of sight between the rates developed for Structures and the SBP submission. All other assets were able through further meetings to validate individual line entries within their SBP submissions.
- The application of CP4 benchmarked rates for signalling management resources, abnormals and risk to new signalling frameworks. Whilst good evidence has been provided for signalling, we believe the application of this adjustment does not reflect the new signalling contracts and the risk transferred to the supply chain;

- Low levels of unit cost coverage for Buildings, E&P and Telecoms. Whilst we accept that these assets have a diverse and wide range of assets and will therefore attract lower levels of unit cost coverage there are a number of weak areas such as the absence of M&E (Mechanical and Electrical) unit costs and evidence of common pricing assumptions. Network Rail has not been able to develop a sufficient spread of unit costs to raise coverage and ensure consistency of pricing across the routes. Too great a reliance is made on historic levels of expenditure with no strategic overview demonstrating the accuracy and reasonableness of the allowances made; and
- During the course of the audit, all routes were visited to review route engagement in the production of Maintenance and Renewals forecasts. Based on our observations during these meetings, the level of engagement and ownership of unit costs was highly variable. Our findings and observations are presented in Appendix B.

As previously stated, Network Rail has not utilised unit costs in the production of its Maintenance forecasts for CP5. The Maintenance Unit Cost (MUC) framework has undergone significant changes since our previous audit of the 2011/12 regulatory accounts². This highlighted the requirement to develop a MUC handbook and to broaden the number of unit costs available.

The MUC handbook was provided to Arup on the 4th January 2013³ and in subsequent meetings with the central Maintenance team we were given visibility of the latest MUC data.

For the purposes of the SBP, Maintenance costs have been derived at route level using historic rates of spend rather than the recently updated Maintenance Unit Cost (MUC) framework. In discussion with Network Rail (Ref. Appendix C meeting schedule) unit costs have been applied to assist in validating the route estimates however supporting evidence of route plans and the process adopted has not been made available.

The implications of not using the MUC framework in developing robust route level estimates raises significant issues in terms of future performance measurement as no costs or volumes exist with which to establish an SBP baseline position.

Based on the above issues and those identified in detail within this report we have updated our view of the quality of Network Rail's unit cost processes in section 1.3. In most instances whilst unit cost processes have been robust in terms of estimating or modelling best practice fundamental issues such as coverage and a strategic overview of risk and inflation assumptions have not been demonstrated as accurate or reasonable.

² Mandate AO/11: Network Rail Regulatory Accounts Data Assurance, Final Report, August 2011

³ MUC Manual 04012013 .pdf, email, Andrew Ballsdon to Alexander Jan, 4th August 2013

1.2.2 Quality of Network Rail's non-unitised M&R expenditure forecasts

Non-unitised Renewals costs represent 39% (including project estimates) of the post efficient SBP forecast rising to 56% on the inclusion of Maintenance expenditure (Ref. table 1.0 columns 5 and 6).

Non-unitised costs therefore represent a significant proportion of the SBP and as such must be demonstrated as accurate and reasonable. No data exists within the SBP submission to support the methodology or approach to pricing non-unitised costs. As such, the Reporter was only able to explore the approach to non-unitised cost estimation through route meetings and technical reviews with members of the central asset teams.

In the context of the SBP, the approach to non-unitised cost estimation must consider:

- Best practice in estimation based on historic spend profiling;
- Demonstration that allowances are reasonable and verifiable;
- Demonstration that risk allowances are excluded;
- Consistency of processes and their application; and
- Strategic overview of non-unitised costs and an understanding of the implications for business planning.

Based on the above criteria and the assessment of Tier 1 data and additional data provided by Network Rail (Appendix D) our key findings for Renewals are as follows:

- Very limited data at route level to support the estimation of non-unitised costs as evidenced in our assessment of Buildings minor works costs. This is an issue across all asset categories where non-unitised costs are utilised;
- The approach to non-unitised cost estimation is highly variable from route to route and contains a combination of historic spend rates and in some cases allowances for "Abnormals" or risk items (Ref. section 11.4);
- Historic spend rates do not always provide sufficient evidence that costs are reasonable and verifiable. Examples include significant increases in CP5 compared to CP4 average levels of expenditure (Ref. section 10.3.3);
- No supporting evidence or analysis has been provided to demonstrate central management guidance in the preparation of non-unitised cost forecasts or the validation of the costs included within the SBP. Whilst we accept that non-unitised costs are highly variable no evidence has been provided demonstrating these costs are accurate, reasonable and do not include layers of risk or contingency; and
- Network Rail has not provided sufficient analysis or supporting information for requests made in the SBP Question Log (Ref. ORR General Question Log, item GEN0053).

Based on the above, the quality of non-unitised Renewals forecasts for CP5 is considered low.

1.2.3 ✂

1.2.4 Reconciliation of CP4 exit unit costs and non-unitised costs

Network Rail's approach to unit cost estimation as detailed in this report raises significant issues in terms of reconciling CP4 exit rates with entry rates for CP5.

Track Renewals have been fully reconciled in terms of understanding the CP4 exit and CP5 entry position (Ref. section 5.3). It should be noted that for Track, the CP5 entry rate is based on point estimates produced by Network Rail on the basis of the 2012/13 workbank.

However, for Buildings, Telecoms and E&P the basis of unit cost estimation has changed for SBP planning purposes. As such, reconciliation of CP4 exit and CP5 entry is no longer possible.

For Signalling assets, Network Rail has applied new framework agreements for a wider range of Signalling unit costs. This reflects an updated commercial position based on tender returns and is considered reasonable notwithstanding separate issues identified in this report.

Where reconciliation of CP4 exit and CP5 entry rates has not been possible, we have undertaken an analysis of the processes adopted and highlighted any specific issues. Key findings are identified within the asset summaries of this report.

1.3 Reporter opinion

Based on the above issues and those identified in greater depth in the specific asset sections of this report, we have re-evaluated the Renewals progressive assurance scorecard. In this updated assessment we have introduced a new column for unit cost coverage and removed the assessment of efficiencies to avoid any overlap with Mandate 35. Separate entries have also been made for each Civils asset category.

Asset	Principals of unit cost production	Risk	Inflation	Treatment of NR management costs	Unit rate coverage	Non-unitised costs
Track	●	●	●	●	●	●
Civils: Earthworks	●	●	●	●	●	●
Civils: Drainage	●	●	●	●	●	●
Civils: Structures	●	●	●	●	●	●
Electrification and Plant	●	●	●	●	●	●
Telecoms	●	●	●	●	●	●
Signalling	●	●	●	●	●	●
Buildings	●	●	●	●	●	●

Table 1.1: Updated progressive assurance scorecard (Arup)

The above indicators are based on a qualitative assessment of each category reflecting the range of approaches adopted for unitised and non-unitised cost estimation.

The most significant issues requiring attention relate to the principles of cost production for Structures, a strategic overview of risk allowances within unit costs and the application of inflation indices for Civils assets.

Based on the evidence presented in the course of Mandate 34, further confidence is also needed that the levels of non-unitised expenditure are accurate and reasonable for the assets shown above.

Whilst this report focuses on aspects of unit cost processes requiring improvements we believe areas of good practice should also be highlighted. These include:

- The assessment of national efficient Track resources to identify opportunities and to test and validate unit costs;
- The derivation of bottom up rates and prices for Buildings, Telecoms and E&P. Whilst we have raised specific issues with application of these approaches the principles of deriving detailed bottom up rates does reflect the work types to be undertaken in CP5;
- The application of new Signalling framework rates in deriving unit costs for CP5;
- Strong evidence of route level engagement in the production of unit costs for Track, Signalling and Buildings; and

- Significant improvements in the supporting documents for the Maintenance Unit Cost (MUC) framework.

Further detail on our opinions and supporting evidence is provided in the detailed analysis for each asset included in this report.

1.4 Acknowledgement

We would like to formally acknowledge the co-operation received from Network Rail staff and express our appreciation to them for the openness they have demonstrated. We also appreciate the considerable time and effort that has been required to provide us with more detail and answers to our questions.